Amendments to the Claims:

Please replace claims 1, 4-7, 9, 16 and 20 and cancels claims 3 and 21-27. All pending claims are reproduced below, including those that remain unchanged.

1. (Currently Amended): An apparatus for sampling an input signal, wherein the apparatus receives a clock signal synchronous with the input signal, the apparatus comprising:

a. synthesizer for receiving the synchronous clock signal, wherein the synthesizer produces a synthesized signal having a synthesized signal frequency dependent on the synchronous clock signal; and

b. sampling module coupled to the synthesizer, wherein the sampling module samples the input signal based on the synthesized signal frequency;

c. a processing unit coupled to the sampling module, wherein the processing unit is adapted to analyze a sampled point from the sampling module and arrange the sampled point in an eye diagram.

2. (Original): The apparatus according to claim 1 further comprising a counter coupled to the synthesizer and the sampling module, wherein the counter sends a strobe signal to the sampling module after a predetermined amount of counts.

3. (Canceled)

4. (Currently Amended): The apparatus according to claim [[3]] 1 wherein the synthesizer signal frequency is programmed as the function

$$F_{DDS} = \frac{1}{R} * \left(\frac{N}{N+1}\right) F_{CLK}$$

wherein R is an integer, N is an amount of sample points per unit interval and FCLK is the clock frequency.

5. (Currently Amended): ~~The apparatus according to claim 4~~ An apparatus for sampling an input signal, wherein the apparatus receives a clock signal synchronous with the input signal, the apparatus comprising:

a synthesizer for receiving the synchronous clock signal, wherein the synthesizer produces a

synthesized signal having a synthesized signal frequency dependent on the synchronous clock signal;

a sampling module coupled to the synthesizer, wherein the sampling module samples the input signal based on the synthesized signal frequency; and

a processing unit coupled to the sampling module, wherein the processing unit analyzes a sampled point from the sampling module and arranges the sampled point in an eye diagram;

wherein the synthesizer signal frequency is programmed as the function

$$F_{DDS} = \frac{1}{R} * \left(\frac{N}{N+1}\right) F_{CLK}$$

wherein R is an integer, N is an amount of sample points per unit interval and FCLK is the clock frequency; and

wherein the eye diagram is formed by arranging an x-coordinate of a particular sample point using the function:

$$x(i) = \mathrm{mod}(R * C * i, N)$$

wherein C is the predetermined number of counts and i is the particular sample point.

6. (Currently Amended): The apparatus according to claim 1 ~~further comprising a processing unit coupled to the synthesizer,~~ wherein the processing unit controls the synthesizer signal frequency.

7. (Currently Amended): The apparatus according to claim 2 ~~further comprising a processing unit coupled to the counter,~~ wherein the processing unit controls the predetermined number of counts.

8. (Original): The apparatus according to claim 1 further comprising a prescaler module coupled to the synthesizer and the synchronous clock signal, wherein the prescaler module adjusts the synchronous clock signal to an acceptable clock frequency to be input into the synthesizer.

9. (Currently Amended): An apparatus for analyzing an input signal, wherein the apparatus receives a clock signal having a clock frequency synchronous with the input signal, the apparatus comprising:

a.a synthesizer for receiving the clock signal, wherein the synthesizer produces a signal having a synthesizer frequency dependent on the clock frequency;

b.a counter coupled to the synthesizer, the counter for receiving the signal and producing a strobe signal;

c.a sampling module coupled to the counter, the sampling module for sampling the input signal upon receiving the strobe signal; and

d.a processor coupled to the sampling module, wherein the processor analyzes a sample point from the sampling module and arranges the sample point in a desired configuration for display to a user of the apparatus.

10. (Original): The apparatus according to claim 9 wherein the desired configuration is an eye diagram.

11. (Original): The apparatus according to claim 9 wherein the processing unit controls the synthesizer frequency.

12. (Original): The apparatus according to claim 9 wherein the counter produces the strobe signal after a predetermined number of counts.

13. (Original): The apparatus according to claim 12 wherein the sampling module samples the input signal at a sampling frequency, wherein the sampling frequency is dependent on the synthesizer frequency and the predetermined number of counts.

14. (Original): The apparatus according to claim 9 wherein the processing unit controls the predetermined number of counts.

15. (Original): The apparatus according to claim 9 further comprising a prescaler module coupled to the synthesizer and the clock signal, wherein the prescaler module adjusts the clock frequency to an acceptable level to be input into the synthesizer.

16. (Currently Amended): A method of analyzing an input signal comprising:

a.receiving a clock signal synchronous with the input signal;

b.generating a synthesized signal from the clock signal, wherein the synthesized signal has a synthesized signal frequency; and

c.sampling the input signal dependent on the synthesized signal frequency;

d. analyzing a sampled point from the input signal;

e. arranging the sampled point in an eye diagram.

17. (Original): The method according to claim 16 further comprising adjusting the clock signal to an acceptable clock frequency to generate the synthesized signal.

18. (Original): The method according to claim 17 wherein the input signal is sampled at a sampling point after a predetermined number of counts, C.

19. (Original): The method according to claim 18 wherein the synthesized signal frequency is a function:

$$F_{DDS} = \frac{1}{R} * \left(\frac{N}{N+1} \right) F_{CLK}$$

wherein R is an integer and N is a number of sample points per unit interval.

20. (Currently Amended): ~~The method according to claim 19 further comprising~~ A method of analyzing an input signal comprising:

receiving a clock signal synchronous with the input signal;

generating a synthesized signal from the clock signal, wherein the synthesized signal has a synthesized signal frequency; and

sampling the input signal dependent on the synthesized signal frequency;

adjusting the clock signal to an acceptable clock frequency to generate the synthesized signal;

wherein the input signal is sampled at a sampling point after a predetermined number of counts, C;

wherein the synthesized signal frequency is a function:

$$F_{DDS} = \frac{1}{R} \bullet \left(\frac{N}{N+1} \right) F_{CLK}$$

wherein R is an integer and N is a number of sample points per unit interval; and

arranging an i^{th} sampling point to form an eye diagram with horizontal resolution of N points per unit interval using function:

$$x(i) = \mathbf{mod}(R \bullet C \bullet i, N)$$

21.-27. (Canceled)